

## **REMARKS**

Claims 27-40 have been canceled herein without prejudice. Claim 41 has been amended.

Claims 42-49 have been added. Claims 41-49 are now pending in the Application. No new matter has been added. Entry of the amendment is respectfully requested. Reconsideration is respectfully requested. Support for the amendments is found in the Specification and original claims.

Claim 41 has been amended to correspond to original claim 20.

New claims 42, 45 and 48 include subject matter recited in original claim 20, paragraphs [0006-0008] of the Specification and the examples 12 and 13 in the table shown on page 6 of the Specification.

New claims 43, 44, 46 and 49 correspond to original claims 25 and 26.

### **Additional Note:**

Independent claim 48 and dependent claim 46 recite corresponding subject matter. Likewise dependent claims 47 and 49 recite corresponding subject matter. Upon allowance of one or more of these claims, Applicants would be willing to cancel any duplicate claims (if present).

### **Information Disclosure Statements**

JP 4193776 was cited in a corresponding Russian application and was listed on an Information Disclosure Statement (IDS) for this reason.

A further IDS is being submitted herewith that lists additional references that are cited in (or correspond to references cited in) the corresponding European application.

### **35 U.S.C. § 112, Second Paragraph Rejections**

Claims 37, 38 and 40 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. These rejections are respectfully traversed.

Nevertheless, the cancellation of these claims has rendered this rejection moot. Also, Applicants have avoided similar issues with respect to the pending claims. Withdrawal of the rejection is respectfully requested.

### **35 U.S.C. § 102 and 103 Rejections**

Claim 40 was rejected under 35 U.S.C. § 102(b) as being anticipated by Endo, et al., U.S. Patent No. 5,679,612 (“Endo”).

Claims 27-40 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ishino, et al., U.S. Patent No. 5,466,643 (“Ishino”).

Claims 27-30, 32, 33, 25-38 and 40 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hayashi, et al., U.S. Patent No. 4,705,763, (“Hayashi”).

Claim 40 was rejected under 35 U.S.C. § 102(b) as being anticipated by Zanoli, et al., U.S. Patent No. 5,023,218 (“Zanoli”).

Claims 40 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishino.

These rejections are respectfully traversed.

### **Claim 41 (and new Claims 45 and 48)**

Claim 41 is directed to a refractory consisting essentially of 0.96% to 1.1% Al<sub>2</sub>O<sub>3</sub>, 6.6% to 8.8% SiO<sub>2</sub>, 89.3% to 91.2% ZrO<sub>2</sub>, 0.6% to 0.9% B<sub>2</sub>O<sub>3</sub>, up to 0.02% Na<sub>2</sub>O, up to 0.1% CaO, up to 0.1% FeO<sub>3</sub>, and up to 0.1% TiO<sub>2</sub>.

New claims 45 and 48 are directed to a refractory consisting essentially of 0.96% to 1.1% Al<sub>2</sub>O<sub>3</sub>, 6.6% to 8.8% SiO<sub>2</sub>, 89.3% to 91.2% ZrO<sub>2</sub>, 0.6% to 0.9% B<sub>2</sub>O<sub>3</sub>, up to 0.1% CaO, up to 0.1% FeO<sub>3</sub>, and up to 0.1% TiO<sub>2</sub>, with MgO, P<sub>2</sub>O<sub>5</sub>, and Na<sub>2</sub>O being absent.

The refractories recited in claims 41, 45 and 48 and the most relevant applied art (e.g. Endo, and Ishino) may be characterized as follows:

	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	ZrO <sub>2</sub>	B <sub>2</sub> O <sub>3</sub>	Na <sub>2</sub> O	CaO	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	P <sub>2</sub> O <sub>5</sub>	MgO	electr. resistance at 1625C
Original Claim 1	0.9-2.5	4-10	86-95	0.1-1.2	≤0.04	≤0.4	≤0.1	≤0.25	-	-	-
Endo claim 1	0.1-1.5	3-5.5	90-95	0.05-2	≥0.05	-	≤ 0.3	subst. no	-	-	-
Endo claim 5	0.1-2	3-8	85-96	0.05-3	≥0.05	-	≤ 0.3	≤ 0.2	-	-	-
Ishino Claim 1	1.1-3	7-11.2	85-91	0.05-1	<b>0.01-0.12 incl. K<sub>2</sub>O</b>	-	-	-	0.05-1	-	-
New claim 41	0.96-1.1	6.6-8.8	89.3-91.2	0.6-0.9	≤.02	≤0.1	≤0.1	≤0.1	-	-	-
New claim 45	0.96-1.1	6.6-8.8	89.3-91.2	0.6-0.9	<b>0</b>	≤0.1	≤0.1	≤0.1	<b>0</b>	<b>0</b>	-
New claim 48	0.96-1.1	6.6-8.8	89.3-91.2	0.6-0.9	<b>0</b>	≤0.1	≤0.1	≤0.1	<b>0</b>	<b>0</b>	≥250

The refractory compositions now recited in claims 41, 45 and 48 consist of the oxides as stated in a very restricted range compared with originally filed claim 1. As disclosed in paragraph [0006] to [0008] of the Specification, it is an object of the invention to minimize the concentration of P<sub>2</sub>O<sub>5</sub> in order to keep a high corrosion resistance of the refractory material and/or to minimize the concentration of Na<sub>2</sub>O and/or CaO in view of the electrical resistance of the final refractory product.

As may be seen from the cited references, even extreme small amounts of a component like Na<sub>2</sub>O (Endo:  $\geq 0.05\%$ ) are mentioned as each of these components can have a significant influence on an important property of the refractory product, namely its electrical resistance (at high temperatures). In this respect both Endo and Ishino just mention electrical resistance at 1500C while according to Applicants' invention electrical resistance at even 1625C is achieved.

According to claims 41, 45 and 48, this is achieved by a strong limitation of the percentage of the various components and, according to claims 5 and 8, by a definite **absence** of Na<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub> and MgO. The presently claimed compositions correspond to examples 12 and 13 of the present application which present extremely high data of electrical resistance, namely > 250 and even >300 ohm-cm! This level of resistance is about twice the electrical resistance of example 4 with a very similar composition but comprising Na<sub>2</sub>O.

The refractories presently recited in the claims are novel and non-obvious over Endo as the Na<sub>2</sub>O content is less than 0.05 (claim 41) or zero (claims 45 and 48).

Also, the refractory presently recited in the claims are novel over Ishino as they have no P<sub>2</sub>O<sub>5</sub> (claims 41, 45, and 48) and less Na<sub>2</sub>O (claims 45, 48).

### **Conclusion**

As the applied art does not disclose or suggest refractories with corresponding ranges, it is respectfully submitted that the pending claims are allowable and non-obvious over the applied art. Withdrawal of the rejection of claim 41 and allowance of all of the pending claims is respectfully requested.

The undersigned will be happy to discuss any aspect of the Application by telephone at the Examiner's convenience.

Respectfully submitted,

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